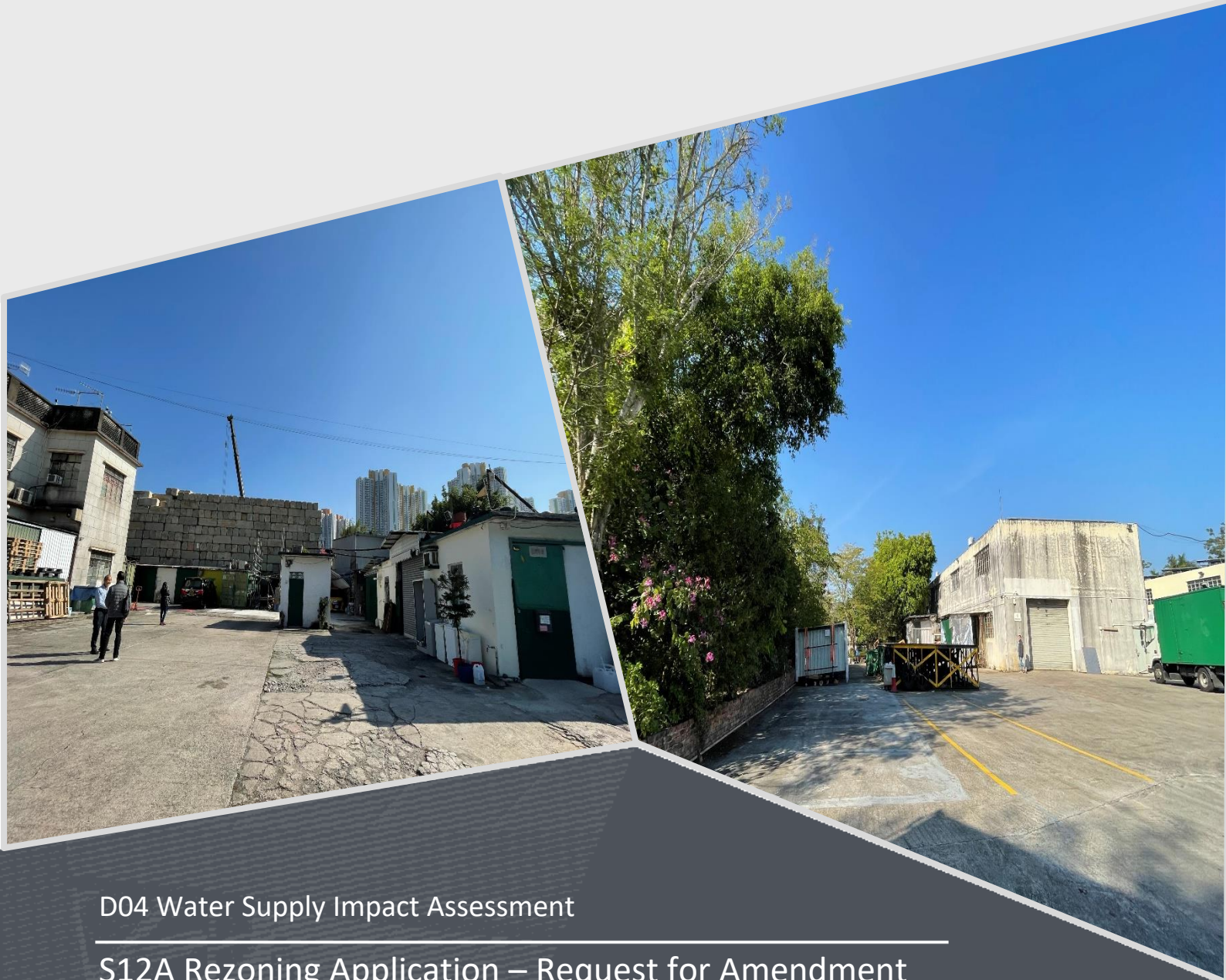


Enclosure | 6

Revised Water Supply Impact Assessment



D04 Water Supply Impact Assessment

S12A Rezoning Application – Request for Amendment to the Lung Yeuk Tau and Kwan Tei South OZP from “Residential (Group C)” Zone and “Agriculture” Zone to “Residential (Group A)2” Zone at Various Lots in D.D. 83 and Adjoining Government Land, Lung Yeuk Tau, N.T.

Reference No. 7076933

Prepared for Carlton Woodcraft Manufacturing Ltd

2 June 2023

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0	13 March 2023	Various	Fred NG	Antony WONG
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1 INTRODUCTION

1.1 Project Background

- 1.1.1 With reference to the latest policy address in developing the Northern Metropolis, it is aimed to optimise the use of land resources, adopt a higher development intensity and increase high-quality housing supply. In order to address the aforementioned needs, it is planned to redevelop a land with an area of approximately 22,445m² comprising various lots in D.D. 83, and the adjoining government land with an area of about 1,358m², Lung Yeuk Tau, New Territories, into proposed flat, shop and services and eating place (“the Site” or “the Proposed Development”).
- 1.1.2 The Site is currently zoned “Residential (Group C)” (“R(C)”) and “Agriculture” (“AGR”) under the Lung Yeuk Tau and Kwan Tei South Outline Zoning Plan (“OZP”). It is planned to develop a commercial complex for shop and services and eating place, and Residential Development comprising five blocks for domestic use.
- 1.1.3 In this regard, a rezoning application under Section 12A of the *Town Planning Ordinance* (“TPO”) to rezone the Site from “R(C)” and “AGR” zones to “Residential (Group A)2” (“R(A)2”) zone under Column 1 shall be required. SMEC Asia Ltd (“SMEC”) has been commissioned to conduct this Water Supply Impact Assessment (“WSIA”) to support the application.

1.2 Site Description

- 1.2.1 The Site is located in a developed area in Lung Yeuk Tau, New Territories, which is a flat land used for workshop, storage and warehouses. Its northern part is currently occupied by a permanent domestic structure, temporary structures for open storage yards, storage of construction materials and workshops, open carparks and vacant land. The southern part is currently occupied by the Applicant for warehouse storage.
- 1.2.2 As shown on **Figure 1-1**, Sha Tau Kok Road (Lung Yeuk Tau) Section is located to the immediate north of the Site that runs along the northeast-southwest direction. Across the opposite site of Sha Tau Kok Road (Lung Yeuk Tau) Section, there are San Wai Barracks, a recycling centre and some warehouses. The Site is mainly surrounded by Tung Chun Soy Sauce factory and some vegetated land to the east, Queen’s Hill Estate to the south, village houses and warehouses to the west, intermixed with temporary structures, scattered vegetated and abandoned land.

1.3 Project Description

- 1.3.1 The Proposed Development will tentatively comprise a commercial complex and a Residential Development with the following components:
- Five Residential Blocks
 - One Clubhouse
 - One Swimming Pool
 - One Commercial Complex

1.4 Objective of the Report

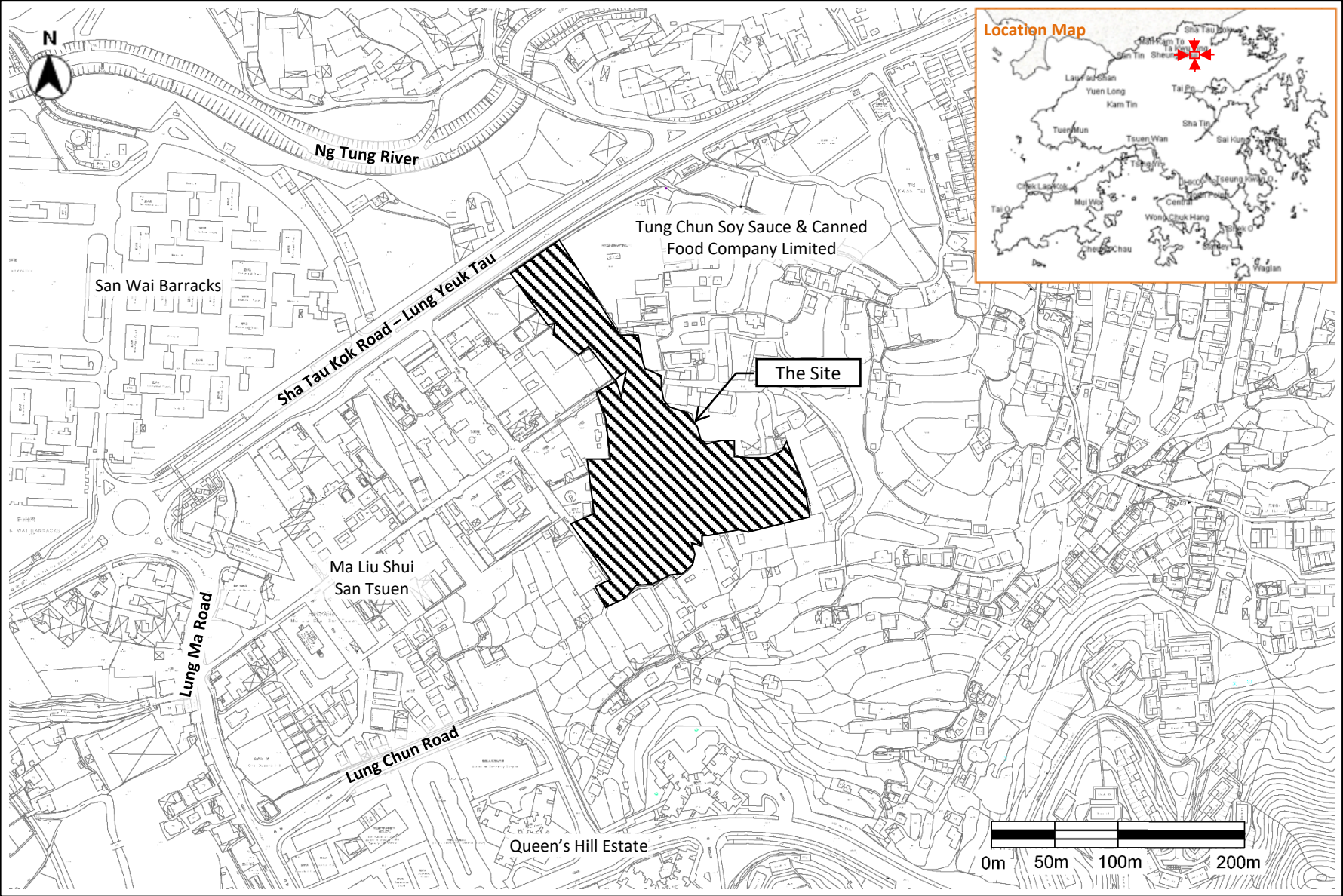
- 1.4.1 The objectives of this WSIA are to:
- Assess the potential impacts of the Proposed Development on the Water Supplies Department (“WSD”) installations and water mains; and
 - Recommend the necessary mitigation measures to alleviate the impacts.

1.5 Reference Materials

1.5.1 In evaluating the water supply impact arising from the Proposed Development, the following documents have been referred to:

- The website of WSD, <http://www.wsd.gov.hk/en/home/index.html>;
- Fresh Water Mains Record Plans (W67880/03-SW-03D and 03-SW-08B) provided by WSD on 8 February 2023;
- Departmental Instruction No. 1309 (DI No. 1309) issued by WSD;
- *Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0* (“GESF”), published by the Environmental Protection Department (“EPD”), March 2005.

Figure 1-1 Site Location and its Environs



2 DESCRIPTION OF EXISTING CONDITIONS

2.1 Existing Water Supply

- 2.1.1 The copies of Fresh Water Mains Record Plans (W67880/03-SW-03D and 03-SW-08B) were obtained from the WSD. The relevant drawings related to the Site are enclosed in **Appendix A**. According to Notes listed in the part copy of fresh water mains record plans provided by the WSD, there are no existing salt water mains and no proposed water mains in the vicinity of the Site.
- 2.1.2 The plans indicate that the existing freshwater mains are located to the northwest of the Site, running along Sha Tau Kok Road – Lung Yeuk Tau.
- 2.1.3 Details of existing fresh water and salt water mains connections to the Site that are maintained by the WSD are summarised below:
1. **Fresh Water Mains.** To the northwest of the Site, there is a fresh water supply main of 600mm diameter ductile iron pipe running along Sha Tau Kok Road – Lung Yeuk Tau, which includes several connection points branching off to connect with ductile iron pipes of 150mm diameter. At the centre of the Site, there is a fresh water supply main of 80mm diameter lined galvanized iron pipes running along Hai Wong Road, which includes several connection points branching off to connect with lined galvanised iron pipes of 25mm and 20mm diameter. The design supply pressure for the freshwater supply pipeline is 15 to 30m head ^[Ref.#1]; and
 2. **Salt Water Mains.** There are no existing salt water mains in the vicinity of the Site.

¹ WSD Performance Pledge 2021-2022, <https://www.wsd.gov.hk/en/about-us/performance-targets-and-achievements/index.html>

3 WATER SUPPLY ANALYSIS

3.1 Assumptions and Methodology

- 3.1.1 Potential fresh water supply impact during the construction stage of the Proposed Development is not addressed in this assessment as water usage for construction purpose would be negligible.
- 3.1.2 In order to assess the acceptability of impacts arising from the operation of the Proposed Development upon the existing water supply system, demand on the water usage of the Proposed Development has been estimated.

3.2 Water Demand Estimation

- 3.2.1 The estimation of water demand and peaking factors adopted in this assessment are referenced from the Departmental Instruction No. 1309 (DI No. 1309) issued by the WSD and GESF issued by the EPD. **Table 3.1** below shows the unit demand for the key fresh water and flushing water uses of the Proposed Development.

Table 3.1 Water Demand Estimation

POPULATION TYPE	FRESH WATER UNIT DEMAND (L/PERSON/DAY)	FLUSHING WATER UNIT DEMAND (L/PERSON/DAY)	REFERENCE
Resident of the Residential Development	300	104	WSD DI No. 1309 GESF
Service Trade	40	-	

- 3.2.2 The peaking factor adopted for proposed fresh water and flushing water in distribution mains is 3.0 and 2.0 respectively.
- 3.2.3 Estimation for peak fresh water and salt water consumption for the Proposed Development is presented in Table 3.2 and Appendix B. As discussed in paragraph 2.1.3, there is no existing salt water mains in the vicinity of the Site and no available flushing water supplies near the Site. Thus, fresh water shall be used for flushing purpose.

Table 3.2 Estimated Fresh Water and Salt Water Demand from the Proposed Development

DESCRIPTION	DAILY WATER DEMAND OF PROPOSED DEVELOPMENT (m ³ /DAY)	PEAKING FACTOR	PEAK DEMAND (m ³ /DAY)
Fresh Water	2,713.2	3	8,139.5
Flushing Water	928.1	2	1,856.2
Total Fresh Water Demand			9,995.7

3.3 Water Supply Estimation

- 3.3.1 As described in **Section 2**, there are existing fresh water main along Sha Tau Kok Road – Lung Yeuk Tau to the northwest of the Site. Assuming the fresh water and flushing water for the Site will be sourced from that existing fresh water main – 600mm diameter ductile iron pipe (DI600) – located at the northwest of the Site and velocity is ranging 1-3m/s, the capacity and utilization ratio of each is estimated in **Table 3.3**:

Table 3.3 Water Supply Estimation

DESCRIPTION	PEAK DEMAND (m ³ /DAY)	TOTAL PEAK DEMAND (m ³ /s)	FRESHWATER SUPPLY MAIN NOMINAL DIAMETER (mm)	ASSUME VELOCITY (m/s)	PIPE CAPACITY (m ³ /s)	UTILISATION RATIO
Total Fresh Water Demand	9,995.7	0.1157	600	3	0.8482	14%
				1	0.2827	41%

3.4 Impact Assessment

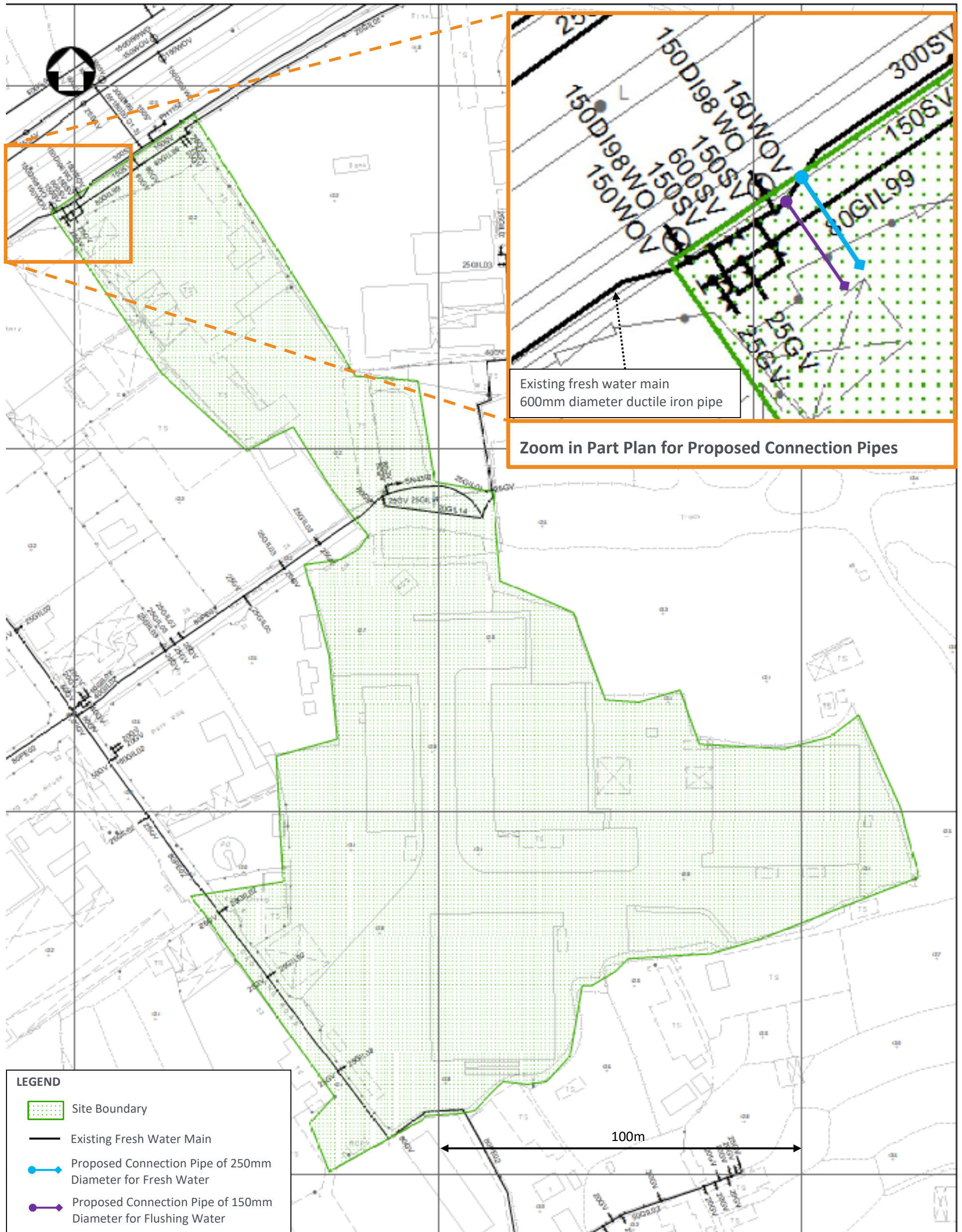
3.4.1 As indicated in **Table 3.3**, the estimated total peak fresh water demand would be about 14 – 41% of the fresh water main capacity. It is noted the water mains of the WSD have been designed with pressure of 15 to 30m for freshwater pipelines. This means the actual capacity available in the water main will be more than enough. No adverse impact on the water supply is anticipated due to the Proposed Development.

3.4.2 Water supply for the Proposed Development is proposed to be provided via a connection pipe of 250mm diameter for fresh water and a connection pipe of 150mm diameter for flushing water both sourcing from the existing DI600 fresh water main. The proposed connections are indicated in **Figure 3-1**. The utilisation ratio is about 128% for the proposed 250mm diameter fresh water pipe and 81% for the proposed 150mm diameter flushing water pipe, see **Table 3.4** below. To provide a conservative estimate of daily water demand of the Proposed Development, peaking factors are adopted, resulting in a slight exceedance in the utilisation ratio for the proposed fresh water main. Therefore, no adverse impact is anticipated due to the Proposed Development.

Table 3.4 Capacity Check for Impact Assessment

DESCRIPTION	PEAK DEMAND (m ³ /DAY)	PEAK DEMAND (m ³ /s)	CONNECTION PIPE NOMINAL DIAMETER (mm)	ASSUME MAX. VELOCITY (m/s)	PIPE CAPACITY (m ³ /s)	UTILISATION RATIO
Fresh Water	8,139.5	0.0942	250	1.5	0.0736	128%
Flushing Water	1,856.2	0.0215	150	1.5	0.0265	81%

Figure 3-1 Existing Fresh Water Mains and Proposed Connection Pipes for the Site



Source: Compiled from Part Copy of Fresh Water Mains Record Plan Drawing no. : W67880/3-SW-3D & 8B

4 CONCLUSION

- 4.1.1 A Water Supply Impact Assessment (“WSIA”) has been conducted to evaluate the possible impacts on the existing water supply during the operation of the Project.
- 4.1.2 The peak estimated fresh water and flushing water demand from the Proposed Development are about 8,139.5 m³/day and 1,856.2 m³/day respectively. Since there is no existing salt water mains in the vicinity of the Site, fresh water shall be used for flushing purpose. The total estimated peak fresh water demand is about 14-41% of the fresh water main capacity. The results indicate that the capacity of the existing water supply system would be sufficient to handle the water demand from the operation of the Site and from the nearby residential uses. Therefore, there should be no adverse impact on the existing water supply system due to the Proposed Development.
- 4.1.3 Water supply for the Proposed Development is proposed to be provided via a connection pipe of 250mm diameter for fresh water and a connection pipe of 150mm diameter for flushing water both sourcing from the existing DI600 fresh water main. The utilization ratio is about 128% for the proposed 250mm diameter fresh water pipe and 81% for the proposed 150mm diameter flushing water pipe. To provide a conservative estimate of daily water demand of the Proposed Development, peaking factors are adopted, resulting in a slight exceedance in the utilisation ratio for the proposed fresh water main. As such, no adverse impact on water supply is anticipated due to the Proposed Development.

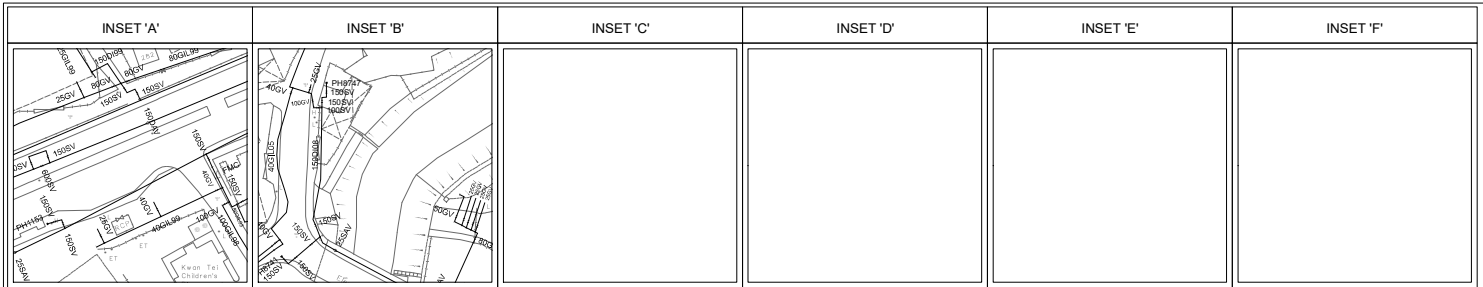
Appendix A FRESH WATER MAIN RECORDS FROM WSD

D04 WATER SUPPLY IMPACT ASSESSMENT

S12A Rezoning Application – Request for Amendment to the Lung Yeuk Tau and Kwan Tei South OZP from “Residential (Group C)” Zone and “Agriculture” Zone to “Residential (Group A)2” Zone at Various Lots in D.D. 83 and Adjoining Government Land, Lung Yeuk Tau, N.T.
Prepared for Carlton Woodcraft Manufacturing Ltd

SMEC Internal Ref. 7076933 |
D04/01
2 June 2023

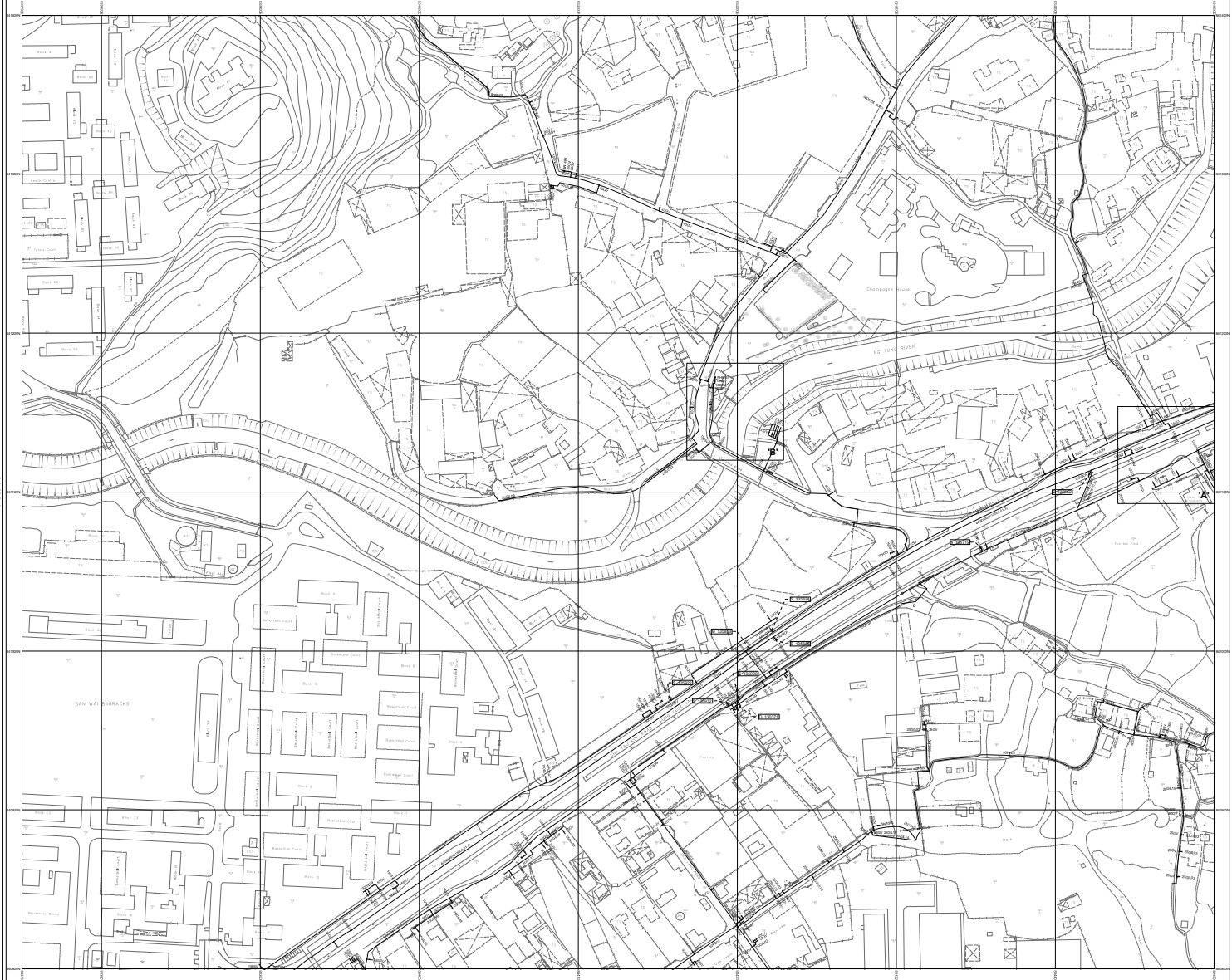
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3-SW-3B



3-SW-8B

NOTES:
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 2. DIMENSIONS OF MAINS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
 3. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.

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FRESH WATER MAINS RECORD PLAN

MA LIU SHUI SAN TSUEN, KWAN TEI

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DATE REVISED : 06/01/2023

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W67880/ 3-SW-3D

SIGNED C. S. CHIN
CE/MNE
DATE 24/12/1998

Water Supplies Department
HONG KONG

INSET 'A'	INSET 'B'	INSET 'C'	INSET 'D'	INSET 'E'	INSET 'F'

3-SW-3D



3-SW-8D

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834300E

834400E

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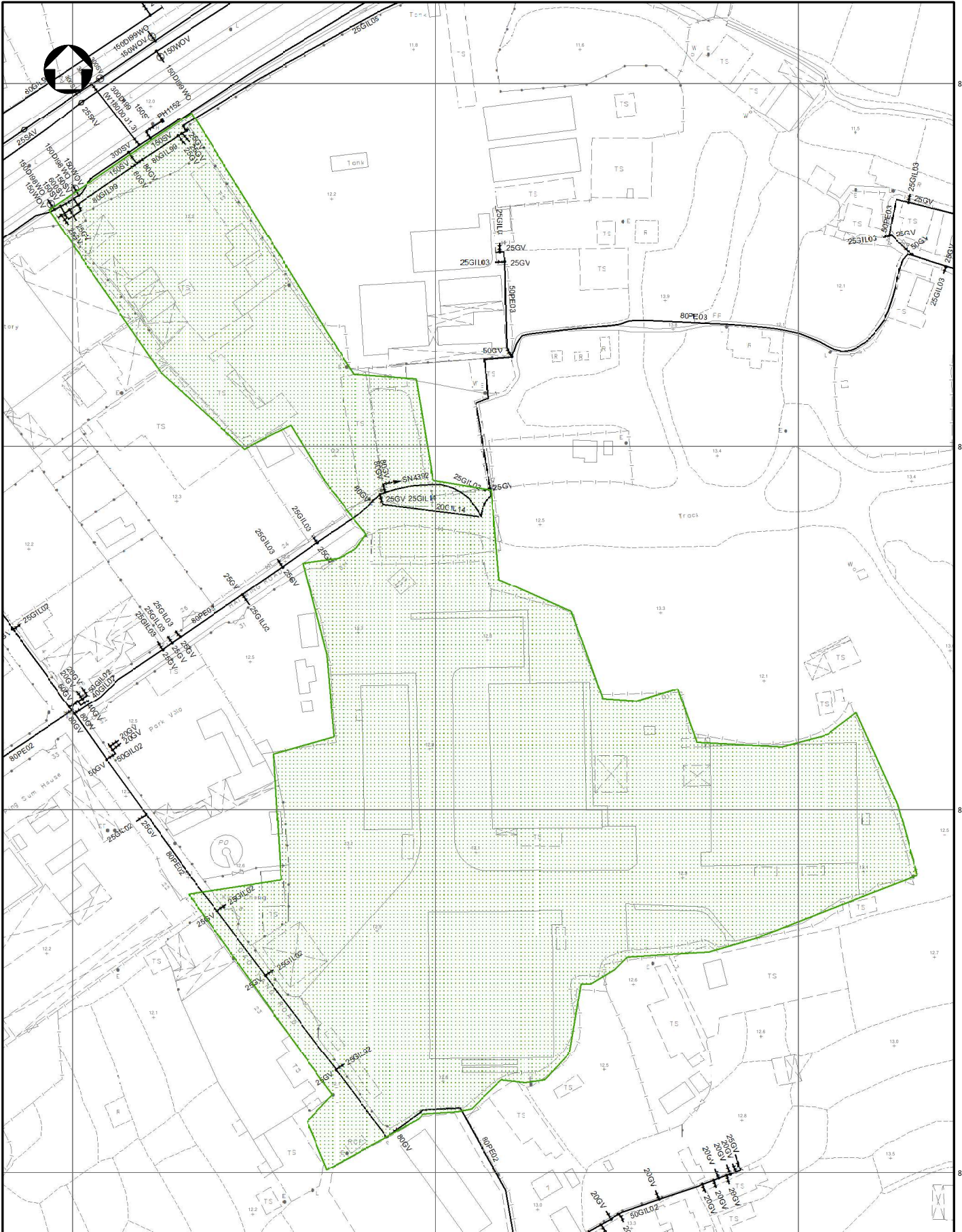
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 4. NO EXISTING SALT WATER MAINS IN THE VICINITY OF THE SITE.
 5. NO PROPOSED WATER MAINS IN THE VICINITY OF THE SITE.
 6. NO EXISTING WSD CABLE IN THE VICINITY OF THE SITE.
 7. NO PROPOSED WSD CABLE IN THE VICINITY OF THE SITE.
 8. THE SITE IS NOT WITHIN WSD GATHERING GROUNDS.
 9. NO WSD LAND ALLOCATION WITHIN THE SITE AREA.
 10. NO WSD SLOPES ARE AFFECTED IN THE VICINITY OF THE SITE.
 11. NO ASBESTOS CEMENT / UNKNOWN MATERIALS MAINS ON THE VICINITY OF THE SITE.
 12. NO CATHODIC PROTECTION MAINS ON THE VICINITY OF THE SITE.

SUBJECT SITE



PART COPY OF FRESH WATER MAINS RECORD PLAN(S)

W67880/3-SW-3D & 8B

FILE REF: (1) IN WSD/NTE 1601/10/7/2016 PT.11 T/J7

REF. CODE: 06W23M	SHEET 1 OF 1	SCALE 1:1000
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水務署
Water Supplies Department

Appendix B CALCULATION OF WATER DEMAND FROM THE PROPOSED DEVELOPMENT

D04 WATER SUPPLY IMPACT ASSESSMENT

S12A Rezoning Application – Request for Amendment to the Lung Yeuk Tau and Kwan Tei South OZP from “Residential (Group C)” Zone and “Agriculture” Zone to “Residential (Group A)2” Zone at Various Lots in D.D. 83 and Adjoining Government Land, Lung Yeuk Tau, N.T.
Prepared for Carlton Woodcraft Manufacturing Ltd

SMEC Internal Ref. 7076933 |
D04/01
2 June 2023

1a Estimated Fresh Water Demand from the Proposed Development		
Fresh Water Demand from Residents of the Residential Development		
No. of Flats	3,305 flats	As advised by the Applicant. Average domestic household size of 2.7 for Queen's Hill District from 2021 population by-census. DI1309
Total No. of Residents	8,924 persons	
Unit Flow Factor (UFF)	0.300 m ³ /day/person	
Fresh Water Demand	2,677.20 m ³ /day	
Fresh Water Demand from Service Trade		
<u>Fresh Water Demand from Staff of the Residential Development</u>		
Total Gross Floor Area (GFA) of non-domestic portion of Residential Development	3,595 m ²	As advised by the Applicant. Worker density Industry Group (All Type) for "Community, Social & Personal Services" is 3.3 staff in 100m ² as stated in Table 8 of ref. 3.
Staff occupancy density	30.3 m ² /staff	
Total No. of Staff	119 staff	DI1309
Unit Flow Factor (UFF)	0.040 m ³ /day/staff	
Fresh Water Demand	4.76 m ³ /day	
<u>Fresh Water Demand from Staff of Retail Shops of the Commercial Complex</u>		
Total GFA of Retail Shops of the Commercial Complex	3,220 m ²	As advised by the Applicant. Worker density Industry Group (All Type) for "Retail Trade" is 3.5 staff in 100m ² as stated in Table 8 of ref. 3.
Staff occupancy density	28.6 m ² /staff	
Total No. of Staff	113 staff	DI1309
Unit Flow Factor (UFF)	0.040 m ³ /day/staff	
Fresh Water Demand	4.52 m ³ /day	
<u>Fresh Water Demand from Staff of Restaurants of the Commercial Complex</u>		
Total GFA of Restaurants of the Commercial Complex	2,350 m ²	As advised by the Applicant. Worker density Industry Group (All Type) for "Community, Social & Personal Services" is 3.3 staff in 100m ² as stated in Table 8 of ref. 3.
Staff occupancy density	19.6 m ² /staff	
Total No. of Staff	120 staff	DI1309
Unit Flow Factor (UFF)	0.040 m ³ /day/staff	
Fresh Water Demand	4.80 m ³ /day	
Fresh Water Demand from Swimming Pool		
Volume of the Swimming pool	656.7 m ³	As advised by the Applicant Swimming Pools Regulation (Cap. 132, section 42)
Frequency for complete maintenance of the pool	1 per year	
Days to fill up the pool	30 days	
Fresh Water Demand after Maintenance	21.89 m ³ /day	
1b Estimated Flushing Water Demand from the Proposed Development		
Flushing Water Demand from Residents of the Residential Development		
No. of Flats	3,305 flats	As advised by the Applicant. Average domestic household size of 2.7 for Queen's Hill District from 2021 population by-census. DI1309
Total No. of Residents	8,924 persons	
Unit Flow Factor (UFF)	0.104 m ³ /day/person	
Flushing Water Demand	928.10 m ³ /day	
Total Fresh Water Demand from Proposed Development		
	2,713.2 m³/day	
Total Flushing Water Demand from Proposed Development		
	928.1 m³/day	
Peaking Factor for Fresh Water Demand	3	DI 1309
Peaking Factor for Flushing Water Demand	2	DI 1309
1c Peak Estimated Demand for Fresh Water Consumption for the Proposed Development		
Total estimated max. daily fresh water consumption	<u>8,139.5 m³/day</u>	
1d Peak Estimated Demand for Flushing Water Consumption for the Proposed Development		
Total estimated max. daily flushing water consumption	<u>1,856.2 m³/day</u>	

Reference

- 1 Departmental Instruction No. 1309 Design criteria (DI 1309) , Water Supplies Department
- 2 Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0 (GESF), Environmental Protection Department of HK Government, March 2005
- 3 Commercial and Industrial Floor Space Utilization Survey, Planning Department, 2005

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